Due Thursday Jan 26 2017

4.1 Pg. 158 # 1, 3, 5, 7, 9, 11, 13, 15, 17

1. $y = \sin(3x+1)$ $\quad \frac{dy}{dx} = 3\cos(3x+1)$

3. $y = \cos(\sqrt{3}x)$ $\quad \frac{dy}{dx} = -\sqrt{3}\sin(\sqrt{3}x)$

5. $y = \left(\frac{\sin x}{1+\cos x}\right)^2$

$$\frac{dy}{dx} = 2\left(\frac{\sin x}{1+\cos x}\right)\left(\frac{(1+\cos x)\cos x - \sin x(-\sin x)}{(1+\cos x)^2}\right)$$

$$= \frac{(2\sin x)(\cos x + \cos^2 x + \sin^2 x)}{(1+\cos x)^3}$$

$$= \frac{(2\sin x)(\cos x + 1)}{(1+\cos x)^3}$$

$$= \frac{2\sin x}{(1+\cos x)^2}$$

7. $y = \cos(\sin x)$ $\quad \frac{dy}{dx} = -\sin(\sin x)\cdot\cos x$

9. $s = \cos\left(\frac{\pi}{2} - 3t\right)$ $\quad v(t) = -\sin\left(\frac{\pi}{2} - 3t\right)(-3)$

$$= 3\sin\left(\frac{\pi}{2} - 3t\right)$$

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11. $s = \frac{4}{3\pi}\sin(3t) + \frac{4}{5\pi}\cos(5t)$

$$v(t) = \frac{4}{3\pi}\cos(3t)\cdot 3 + \frac{4}{5\pi}\left(-\sin(5t)\cdot 5\right)$$

$$= \frac{4}{\pi}\cos(3t) - \frac{4}{\pi}\sin(5t)$$

$$= \frac{4}{\pi}\left(\cos(3t) - \sin(5t)\right)$$

13. $y = (x+\sqrt{x})^{-2}$ $\quad \frac{dy}{dx} = -2(x+\sqrt{x})^{-3}\left(1+\frac{1}{2}x^{-\frac{1}{2}}\right)$

$$\frac{dy}{dx} = \frac{-2}{(x+\sqrt{x})^3}\left(1+\frac{1}{2\sqrt{x}}\right)$$

$$= \frac{-2}{(x+\sqrt{x})^3}\left(\frac{2\sqrt{x}+1}{2\sqrt{x}}\right) = \frac{-4\sqrt{x}-2}{2\sqrt{x}(x+\sqrt{x})^3}$$

15. $y = \sin^{-5}x - \cos^3 x \quad = (\sin x)^{-5} - (\cos x)^3$

$$\frac{dy}{dx} = -5(\sin x)^{-6}(\cos x) - 3(\cos x)^2(-\sin x)$$

17. $y = \sin^3 x \tan(4x) \quad = (\sin x)^3 \cdot \tan(4x)$

$$\frac{dy}{dx} = 3(\sin x)^2\cos x\cdot\tan(4x) + (\sin x)^3\sec^2(4x)\cdot 4$$

$$= 3\sin^2 x\cos x\tan(4x) + 4\sin^3 x\sec^2(4x)$$